

11 2639

O'Bryen, Barbara

From: Swope, Sheridan
Sent: Tuesday, January 20, 2004 12:41 PM
To: O'Bryen, Barbara *D. Swope*
Subject: 09/818,939

Barb, Would you align the following sequences?
All from NCBI

[NP_886873 </entrez/viewer.fcgi?db=protein&val=33599313>](#)

[NP_882677 </entrez/viewer.fcgi?db=protein&val=33595034>](#)

[NP_879578 </entrez/viewer.fcgi?db=protein&val=33591934>](#)

[Q57506 </entrez/viewer.fcgi?db=protein&val=34978374>](#)

[P15318 </entrez/viewer.fcgi?db=protein&val=34978355>](#)

Thanks!!

See my address below.

Sheridan Swope, Ph.D.
Patent Examiner, AU 1652
Recombinant Enzymes
sheridan.swope@uspto.gov
571-272-0943 (voice & FAX)
E03A70 Remsen Bld (Office)
E03A81 Remsen Bld (Mailbox)
400 Dulany Street
Alexandria, VA

TOIG of: np879578 check: 6141 from: 1 to: 1706

LOCUS NP 879578 1706 aa linear BCT 13-JAN-2004

DEFINITION bifunctional hemolysin-adenylate cyclase precursor [Bordetella pertussis Tohama I].

ACCESSION NP_879578

VERSION NP_879578.1 GI:33591934

DBSOURCE REFSEQ: accession NC_002929.2

KEYWORDS

SOURCE Bordetella pertussis Tohama I

ORGANISM Bordetella pertussis Tohama I

REFERENCE 1 (residues 1 to 1706)

AUTHORS Parkhill, J., Sebainia, M., Preston, A., Murphy, L.D., Thomson, N., Harris, D.E., Holden, M.T.G., Churcher, C.M., Bentley, S.D., Mungall, K.L., Cerdano-Tarraga, A.M., Temple, L., James, K., Harris, B., Quail, M.A., Achtman, M., Atkin, R., Baker, S., Basham, D., Bason, N., Cherevach, I., Chillingworth, T., Collins, M., Cronin, A., Davis, P., Doggett, J., Feltwell, T., Goble, A., Hamlin, N., Hauser, H., Holtroyd, S., Jagsels, K., Leather, S., Moule, S., Norbertczak, H., O'Neill, S., Ormond, D., Price, C., Rabinowitsch, E., Rutter, S., Sanders, M., Saunders, D., Seeger, K., Sharp, S., Simmons, M., Skelton, J., Squares, R., Stevens, S., Stevens, K., Unwin, L., Whitehead, S., Barrrell, B.G. and Maskell, D.J.

TITLE Comparative analysis of the genome sequences of Bordetella pertussis, Bordetella parapertussis and Bordetella bronchiseptica

JOURNAL Nat. Genet. 35 (1), 32-40 (2003)

MEDLINE 22827994

PubMed 12910271

REFERENCE 2 (residues 1 to 1706)

AUTHORS Sebainia, M.

TITLE Direct Submission

JOURNAL Submitted (06-AUG-2003) Submitted on behalf of the Pathogen Sequencing Unit, Sanger Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge CB10 1SA E-mail: ms@sanger.ac.uk

COMMENT Method: conceptual translation.

FEATURES

source

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/strain="Tohama I"

/db_xref="taxon:257313"

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/locus_tag="BP0760"

/coded_by="NC_002929.2:776228..781348"

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/transl_table=11

/db_xref="GeneID:2664492"

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HAGYOEPRFKETSDGVAYOYRKAGDDPEYAVYTNAGIPITADIMFALPHLSNFRDSRSSTV

SGDSVTYIATRTTRASATGSLDERIDILMKIARAGARSAGTEARQRYGDMMIIVITDPELEVR

NALNRRAAVAGAOVVGTONPPEADDEKIFVATSGESOMLTROQLKEYIGQCGEGVYENRAY

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TOIG of: np882677 check: 4166 from: 1 to: 1740

LOCUS NP 882677 1740 aa linear BCT 13-JAN-2004

DEFINITION bifunctional hemolysin-adenylate cyclase precursor [Bordetella parapertussis].

ACCESSION NP_882677

VERSION NP_882677.1 GI:33595034

DBSOURCE REFSEQ: accession NC_002928.3

KEYWORDS

SOURCE complete genome.

ORGANISM Bordetella parapertussis

Bordetella parapertussis

Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales; Alcaligenaceae; Bordetella.

REFERENCE 1 (residues 1 to 1740)

AUTHORS Parkhill, J., Sebainia, M., Preston, A., Murphy, L.D., Thomson, N., Harris, D.E., Holden, M.T.G., Churcher, C.R., Bentley, S.D., Mungall, K.L., Cerdano-Tarraga, A.M., Temple, L., James, K., Harris, B., Quail, M.A., Achtman, M., Atkin, R., Baker, S., Basham, D., Bason, N., Cherevach, I., Chillingworth, T., Collins, M., Cronin, A., Davis, P., Doggett, J., Feltwell, T., Goble, A., Hamlin, N., Hauser, H., Holtroyd, S., Jagsels, K., Leather, S., Moule, S., Norbertczak, H., O'Neill, S., Ormond, D., Price, C., Rabinowitsch, E., Rutter, S., Sanders, M., Saunders, D., Seeger, K., Sharp, S., Simmons, M., Skelton, J., Squares, R., Stevens, S., Stevens, K., Unwin, L., Whitehead, S., Barrrell, B.G. and Maskell, D.J.

TITLE Comparative analysis of the genome sequences of Bordetella pertussis, Bordetella parapertussis and Bordetella bronchiseptica

JOURNAL Nat. Genet. DOI: 10 (2003)

REFERENCE 2 (residues 1 to 1740)

AUTHORS Sebainia, M.

TITLE Direct Submission

JOURNAL Submitted (06-AUG-2003) Submitted on behalf of the Pathogen Sequencing Unit, Sanger Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge CB10 1SA E-mail: ms@sanger.ac.uk

COMMENT PROVISIONAL REFSEQ: This record has not yet been subject to final NCBI review. The reference sequence was derived from CAB40062.

METHOD: conceptual translation.

FEATURES

source

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 IGNAGTILTDIMDFALMPLNSPDRSASVTSQSVTDIYLARTBRASSEATGCLDERIDILMLKIR
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 TOIG of: np886873 check: 3378 from: 1 to: 1740
 LOCUS NP_886873 1740 aa linear BCT 13-JAN-2004
 DEFINITION bifunctional hemolysin-adenylate cyclase precursor [Bordetella
 bronchiseptica RS50].
 ACCESSION NP_886873 GI:33599313
 VERSION NP_886873.1 GI:33599313
 REFSEQ accession NC_002927.3
 DSOURCE complete genome.
 KEYWORDS Bordetella bronchiseptica RS50
 ORGANISM Bordetella bronchiseptica RS50
 Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales;
 Alcaligenaceae; Bordetella.
 REFERENCE 1 (residues 1 to 1740)
 AUTHORS Parthill,L., Sebithia,M., Preston,A., Murphy,L.D., Thomson,N.,
 Harris,D.E., Holden,M.T., Churcher,C.M., Bentley,S.D.,
 Mungall,K.L., Cerdano-Tarraga,A.M., Temple,T.L., James,K., Harris,B.,
 Quail,M.A., Achtman,M., Aikin,R., Baker,S., Basham,D., Bason,N.,
 Cherevach,I., Chillingworth,T., Collins,M., Cronin,A., Davis,F.,
 Doggett,J., Felwell,T., Goble,A., Hamlin,N., Hauser,H.,
 Holtroyd,S., Jagers,K., Leather,S., Moutle,S., Notbreich,H.,
 O'Neill,S., Ormond,D., Price,C., Rabinovitch,E., Rutter,S.,
 Sanders,M., Saunders,D., Seeger,K., Sharp,S., Simmonds,M.,
 Skelton,J., Squares,R., Squares,S., Stevens,K., Unwin,L.,
 Whitehead,S., Barrett,B.G. and Maskell,D.J.
 TITLE Comparative analysis of the genome sequences of *Bordetella*
pertussis, *Bordetella parapertussis* and *Bordetella bronchiseptica*
 Nat. Genet. 35 (1), 32-40 (2003)
 JOURNAL
 MEDLINE PubMed 12910271
 PUBLISHED 22827954
 REFERENCE 2 (residues 1 to 1740)
 AUTHORS Sebithia,M.
 TITLE Direct Submission
 JOURNAL Submitted (06-AUG-2003) Submitted on behalf of the Pathogen
 Sequencing Unit, Sanger Institute, Wellcome Trust Genome Campus,
 Hinxton, Cambridgeshire CB10 1SA E-mail: mss@sanger.ac.uk
 COMMENT PROVISIONAL REFSEQ: This record has not yet been subject to final
 NCBI review. The reference sequence was derived from CAE30822.
 Method: conceptual translation.
 FEATURES
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Davis,P., Doggett,J., Felwell,T., Goble,A., Hamlin,N., Hauser,H.,
Holroyd,S., Jagers,K., Leather,S., Moule,S., Norbertczek,H.,
O'Neill,S., Ormond,D., Price,C., Rabinowitsch,E., Ruter,S.,
Sanders,M., Saunders,D., Seeger,K., Sharp,S., Simmonds,M.,
Skellern,J., Squares,R., Squares,S., Stevens,K., Unwin,L.,
Whitehead,S., Barrett,B.G. and Maskell,D.J.
Comparative analysis of the genome sequences of Bordetella
pertussis, Bordetella parapertussis and Bordetella bronchiseptica
Nat. Genet. 35 (1), 32-40 (2003)
JOURNAL MEDLINE 22827954
REMARK
SEQUENCE FROM N.A.
STRAIN=Tomama I / ATCC BAA-589 / NCTC 13251
3 (residues 1 to 1706)
REFERENCE Glaeser,P., Sakamoto,H., Bellalou,J., Ullmann,A. and Danchin,A.
AUTHORS Secretion of cyclolysin, the calmodulin-sensitive adenylate
TITLE cyclase-haemolysin bifunctional protein of Bordetella pertussis
JOURNAL EMBO J. 7 (12), 3997-4004 (1988)
MEDLINE 89091151
REMARK
SEQUENCE OF 1489-1706 FROM N.A., AND BIFUNCTIONAL PROTEIN
DESCRIPTION.
STRAIN=18323
4 (residues 1 to 1706)
REFERENCE Munier,H., Gilles,A.M., Glaeser,P., Krin,E., Danchin,A., Sarfati,R.
AUTHORS and Barzu,O.
TITLE Isolation and characterization of catalytic and calmodulin-binding
JOURNAL domains of Bordetella pertussis adenylate cyclase
MEDLINE Eur. J. Biochem. 196 (2), 469-474 (1991)
91177021
REMARK
DOMAINS.
5 (residues 1 to 1706)
REFERENCE Glaeser,P., Elmaoglu-Lazaridou,A., Krin,E., Ladant,D., Barzu,O. and
AUTHORS Danchin,A.
TITLE Identification of residues essential for catalysis and binding of
JOURNAL calmodulin in Bordetella pertussis adenylate cyclase by
MEDLINE site-directed mutagenesis
EMBO J. 8 (3), 967-972 (1989)
89251630
REMARK
MUTAGENESIS.
6 (residues 1 to 1706)
REFERENCE Glaeser,P., Munier,H., Gilles,A.M., Krin,E., Porumb,T., Barzu,O.,
AUTHORS Sarfati,R., Pelleuer,C. and Danchin,A.
TITLE Functional consequences of single amino acid substitutions in
JOURNAL calmodulin-activated adenylate cyclase of Bordetella pertussis
MEDLINE EMBO J. 10 (7), 1683-1688 (1991)
91266896
REMARK
MUTAGENESIS.
7 (residues 1 to 1706)
REFERENCE Danchin,A.
AUTHORS Phylogeny of adenylate cyclases
JOURNAL Adv. Second Messenger Phosphoprotein Res. 27, 109-162 (1993)
93119764
REMARK
REVIEW.
8 (residues 1 to 1706)
REFERENCE Hackett,M., Guo,L., Shabanowitz,J., Hunt,D.F. and Hewlett,E.L.
AUTHORS Internal lysine palmitoylation in adenylate cyclase toxin from
JOURNAL Bordetella pertussis
MEDLINE Science 266 (5184), 433-435 (1994)
95025937
REMARK
PALMITOYLATION OF LYS-983.
9 (residues 1 to 1706)
REFERENCE Basar,T., Havlicek,V., Bezouskova,S., Halad,P., Hackett,M. and
AUTHORS Sebo,P.
TITLE The conserved lysine 860 in the additional fatty-acylation site of
JOURNAL Bordetella pertussis adenylate cyclase is crucial for toxin
MEDLINE J. Biol. Chem. 274 (16), 10777-10783 (1999)
99214144
REMARK
PALMITOYLATION OF LYS-860.
On Sep 23, 2003 this sequence version replaced gi:117789.
COMMENT
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This SWISS-PROT entry is copyright. It is produced through a
collaboration between the Swiss Institute of Bioinformatics and
the EMBL outstation - the European Bioinformatics Institute.
The original entry is available from http://www.ebi.ac.uk/sprot
and http://www.expasy.ch/sprot
-----
[FUNCTION] This adenylate cyclase belongs to a special class of
bacterial toxin. It causes whooping cough by acting on mammalian
cells by elevating cAMP-concentration and thus disrupts normal cell
function.
[CATALYTIC ACTIVITY] ATP = 3',5'-cyclic AMP + diphosphate.
[ENZYME REGULATION] Activated by host calmodulin.
[SUBCELLULAR LOCATION] Secreted.
[DOMAIN] The Gly-rich region is probably involved in binding
calcium, which is required for target cell-binding or cyclolytic
activity (By similarity).
[PM] Released in a processed form.
[PM] Palmitoylated by cyc. The toxin only becomes active when
modified in position Lys-983.
[SIMILARITY] IN the N-terminal section; belongs to the adenylate
cyclase class-2 family.
[SMILARITY] IN THE C-TERMINAL SECTION; BELONGS TO THE RTX
PROKARYOTIC TOXIN FAMILY.
FEATURES
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precursor"
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HLA)."
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TOIG of: q57506 check: 4927 from: 1 to: 1706

LOCUS       Q57506             1706 aa             linear    ECT 15-MAR-2004
DEFINITION   Bifunctional hemolysin-adenylate cyclase precursor (Cyclolysin)
              (ACT) (AC-HLY) [Contains: Calmodulin-sensitive adenylate cyclase
              (ATP pyrophosphate-lyase) (Adenyllyl cyclase); Hemolysin].
ACCESSION   Q57506
VERSION     057506
DBSOURCE    SwissProt: locus CYAA_BOBR, accession Q57506;
              class: standard.
              extra accessions: O05179, created: Nov 1, 1997.
              sequence updated: Oct 10, 2003.
              xref: gi: 11602642, gi: 11602643, gi: 33575039, gi: 33575359
              xref: (non-sequence databases): HSBP40136, InterProIPR005165,
              InterProIPR001343, InterProIPR003995, PfamPF03497, PfamPF00333,
              PfamPF02382, PRINTSPR00313, PRINTSR01488, PROSITEPS00330
KEYWORDS     Hemolysin; Virulence; CAMP biosynthesis; Lyase; Toxin; ATP-binding;
              Calcium-binding; Calmodulin-binding; Repeat; Lipoprotein;
              Palmitate; Whooping cough; Complete proteome.
SOURCE      Bordetella bronchiseptica
ORGANISM    Bordetella bronchiseptica
              Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales;
              Alcaligenaceae; Bordetella.
REFERENCE   1 (residues 1 to 1706)
AUTHORS     Betsou, F., Simeiro, O., Danchin, A. and Guiso, N.
TITLE       Cloning and sequence of the Bordetella bronchiseptica adenylate
              cyclase-hemolysin-encoding gene: comparison with the Bordetella
              pertussis gene
JOURNAL     Gene 162 (1), 165-166 (1995)
MEDLINE    96009899
REMARK      SEQUENCE FROM N.A.
              STRAIN-CIP 9.73
REFERENCE   2 (residues 1 to 1706)
AUTHORS     Danchin, A. and Boursaux-Eude, C.
TITLE       Direct Submission
JOURNAL     SUBMITTED (-DEC-2000)
REMARK      REVISIONS TO 1556-1559.
REFERENCE   3 (residues 1 to 1706)
AUTHORS     Parkhill, J., Sebahia, M., Preston, A., Murphy, L.D., Thomson, N.,
              Harris, D.E., Holden, M.T.G., Churcher, C.M., Bentley, S.D.,
              Mungall, K.L., Cerdeno-Tarraga, A.-M., Temple, L., James, K.,
              Harris, B., Quail, M.A., Achtman, M., Atkin, R., Baker, S., Bauman, D.,
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              Sanders, M., Saunders, D., Seeger, K., Sharp, S., Simmonds, M.,
              Skelton, J., Squares, R., Seeger, K., Sharp, S., Simmonds, M.,
              Whitehead, S., Barrell, B.G. and Masefield, D.J.
TITLE       Comparative analysis of the genome sequences of Bordetella

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JOURNAL     Nat. Genet. 35 (1), 32-40 (2003)
MEDLINE    22827954
REMARK      SEQUENCE FROM N.A.
              STRAIN-RB50 / ATCC BAA-588
              On Sep 23, 2003 this sequence version replaced gi:19864329.
COMMENT     This SWISS-PROT entry is copyright. It is produced through a
              collaboration between the Swiss Institute of Bioinformatics and
              the EMBL outstation - the European Bioinformatics Institute.
              The original entry is available from http://www.ebi.ac.uk/seqpro
              and http://www.ebi.ac.uk/seqpro
              [FUNCTION] This adenylate cyclase belongs to a special class of
              bacterial toxin. It causes whooping cough by acting on mammalian
              cells by elevating CAMP-concentration and thus disrupts normal cell
              function.
              [CATALYTIC ACTIVITY] ATP = 3',5'-cyclic AMP + diphosphate.
              [ENZYMATIC REGULATION] Activated by host calmodulin.
              [SUBCELLULAR LOCATION] Secreted.
              [DOMAIN] The gly-rich region is probably involved in binding
              calcium, which is required for target cell-binding or cytolytic
              activity (by similarity).
              [PM] Released in a processed form.
              [SIMILARITY] In the N-terminal section; belongs to the adenyllyl
              cyclase class-2 family.
              [SIMILARITY] IN THE C-TERMINAL SECTION; BELONGS TO THE RTX
              PROKARYOTIC TOXIN FAMILY.
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TOIG of: np882677 check: 4166 from: 1 to: 1740

LOCUS NP_882677 1740 aa linear BCT 13-JAN-2004

DEFINITION bifunctional hemolysin-adenylate cyclase precursor [Bordetella parapertussis].

ACCESSION NP_882677

VERSION NP_882677.1 GI:33595034

SOURCE REFSEQ: accession NC_002928.3

KEYWORDS complete genome.

SOURCE Bordetella parapertussis

ORGANISM Bordetella parapertussis

REFERENCE 1 (residues 1 to 1740)

AUTHORS Alcaligenaceae; Bordetella.

1 (residues 1 to 1740)

Parkhill, D., Sebailia, M., Preston, A., Murphy, L. D., Thomson, N., Harris, D. E., Holden, M. T. G., Churcher, C. R., Bentley, S. D., Mungall, K. L., Cerdano-Tarraga, A. M., Temple, L., James, K., Harris, B., Quail, M. A., Achtman, M., Atkin, R., Baker, S., Basham, D., Bason, N., Chevreton, I., Chillingworth, T., Collins, M., Cronin, A., Davis, P., Doggett, V., Feltwell, T., Goble, A., Hamlin, N., Hauser, H., Holtroyd, S., Jagsels, K., Leather, S., Moule, S., Norbertczak, H., O'Neill, S., Ormond, D., Price, C., Rabinowitsch, E., Rutter, S., Sanders, M., Saunders, D., Seeger, K., Sharp, S., Simmonds, M., Skelton, J., Squares, R., Squares, S., Stevens, K., Unwin, L., Whitehead, S., Barrell, B. G. and Maskell, D. J.

TITLE Comparative analysis of the genome sequences of Bordetella pertussis, Bordetella parapertussis and Bordetella bronchiseptica

JOURNAL Nat. Genet. DOI, 10 (2003)

REFERENCE 2 (residues 1 to 1740)

Sebailia, M.

AUTHORS Direct Submission

JOURNAL Submitted (06-AUG-2003) Submitted on behalf of the Pathogen Sequencing Unit, Sanger Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge CB10 1SA E-mail: ms@sanger.ac.uk

COMMENT PROVISIONAL REFSEQ: This record has not yet been subject to final NCBI review. The reference sequence was derived from CAF40062.

Method: conceptual translation.

FEATURES

Location/Qualifiers

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TOIG of: np886873 check: 3378 from: 1 to: 1740
LOCUS NP_886873 1740 aa linear BCT 13-JAN-2004
DEFINITION bifunctional hemolysin-adenylate cyclase precursor [Bordetella
ACCESSION NP_886873
VERSION NP_886873.1 GI:33599313
SOURCE REFSEQ: accession NC_002927.3
KEYWORDS complete genome.
ORGANISM Bordetella bronchiseptica RB50
Bordetella bronchiseptica RB50
Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales;
Alcaligenaceae; Bordetella.
REFERENCE
1 (residues 1 to 1740)
AUTHORS Parkhill,J., Sebailha,M., Preston,A., Murphy,L.D., Thomson,N.,
Harris,D.E., Holden,M.T., Churcher,C.M., Bentley,S.D.,
Mungall,K.L., Cerdano-Tarraga,A.M., Temple,L., James,K., Harris,B.,
Quail,M.A., Achtman,M., Atkin,R., Baker,S., Basham,D., Bason,N.,
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Sanders,M., Saunders,D., Seeger,K., Sharp,S., Simmonds,M.,
Skellern,J., Squares,R., Squares,S., Stevens,K., Unwin,L.,
Whitehead,S., Barrell,B.G. and Maskell,D.J.
TITLE Comparative analysis of the genome sequences of Bordetella
pertussis, Bordetella parapertussis and Bordetella bronchiseptica
Nat. Genet. 35 (1), 32-40 (2003)
JOURNAL MEDLINE
22827954
PUBMED 12910271
REFERENCE 2 (residues 1 to 1740)
AUTHORS Sebailha,M.
TITLE Direct Submission
JOURNAL Submitted (06-AUG-2003) Submitted on behalf of the Pathogen
Sequencing Unit, Sanger Institute, Wellcome Trust Genome Campus,
Hinxton, Cambridge CB10 1SA E-mail: ms@sanger.ac.uk
COMMENT PROVISIONAL REFSEQ: This record has not yet been subject to final
NCBI review. The reference sequence was derived from CAE30822.
Method: conceptual translation.
FEATURES
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TOIG of: p15318 check: 6141 from: 1 to: 1706
LOCUS      P15318                      1706 aa          linear      BCT 15-MAR-2004
DEFINITION Bifunctional hemolysin-adenylate cyclase precursor (cyclolysin)
            (ACT) (AC-HLY) [contains: Calmodulin-sensitive adenylyl cyclase
            (ATP pyrophosphatase-lyase) (Adenylyl cyclase); Hemolysin].
ACCESSION  P15318 GI:34978355
VERSION    swissprot: locus CYAA_BORPE, accession P15318;
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            class: standard.
            created: Apr 1, 1990.
            sequence updated: Oct 10, 2003.
            annotation updated: Mar 15, 2004.
            xrefs: gi: 396665, gi: 396666, gi: 412230, gi: 412231, gi: 580667,
            gi: 580668, gi: 33571514, gi: 33571578, gi: 39731, gi: 39732, gi:
            69555
            xrefs (non-sequence databases): HSSPP40136, InterProIPR005165,
            InterProIPR001343, InterProIPR003995, PfamPF03497, PfamPF00353,
            PfamPF02382, PRINTSPR00313, PRINTSPR01488, PROSITEPS00330
            Hemolysis; Virulence; CAMP biosynthesis; Lyase; Toxin; ATP-binding;
            Calcium-binding; Calmodulin-binding; Repeat; Lipoprotein;
            Palmitate; Whooping cough; Complete proteome.
SOURCE     Bordetella pertussis
            Bordetella pertussis
ORGANISM   Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales;
            Alcaligenaceae; Bordetella.
REFERENCE  1 (residues 1 to 1706)
AUTHORS   Glaser,P., Ladtant,D., Sezer,O., Pichot,F., Ullmann,A. and
            Danchin,A.
TITLE     The calmodulin-sensitive adenylyl cyclase of Bordetella pertussis:
            cloning and expression in Escherichia coli
JOURNAL   Mol. Microbiol. 2 (1), 19-30 (1988)
MEDLINE   88216178
REMARK
SEQUENCE FROM N.A.
STRAIN=18323
REFERENCE  2 (residues 1 to 1706)
AUTHORS   Parkhill,J., Sebailha,M., Preston,A., Murphy,L.D., Thomson,N.,
            Harris,D.E., Holden,M.T.G., Churcher,C.M., Bentley,S.D.,
            Mungall,K.L., Cerdano-Tarraga,A.-M., Temple,L., James,K.,
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            Skelton,J., Squares,R., Steeger,K., Stevens,K., Unwin,L.,
            Whitehead,S., Barrett,B.G. and Maskell,D.J.
TITLE     Comparative analysis of the genome sequences of Bordetella
            pertussis, Bordetella parapertussis and Bordetella bronchiseptica
JOURNAL   Nat. Genet. 35 (1), 32-40 (2003)
MEDLINE   22827954
REMARK
SEQUENCE FROM N.A.
STRAIN=Tohama I / ATCC BAA-589 / NCTC 13251
REFERENCE  3 (residues 1 to 1706)
AUTHORS   Glaser,P., Sakamoto,H., Bellalou,J., Ullmann,A. and Danchin,A.
TITLE     Secretion of cyclolysin, the calmodulin-sensitive adenylyl
            cyclase-hemolysin bifunctional protein of Bordetella pertussis
JOURNAL   EMBO J. 7 (12), 3997-4004 (1988)
MEDLINE   89091151
REMARK
SEQUENCE OF 1489-1706 FROM N.A., AND BIFUNCTIONAL PROTEIN
DESCRIPTION.
STRAIN=18323
REFERENCE  4 (residues 1 to 1706)
AUTHORS   Munier,H., Gilles,A.M., Glaser,P., Krin,E., Danchin,A., Sarfati,R.
            and Barzu,O.
TITLE     Isolation and characterization of catalytic and calmodulin-binding
            domains of Bordetella pertussis adenylyl cyclase
JOURNAL   Eur. J. Biochem. 196 (2), 469-474 (1991)
MEDLINE   91177021
REMARK
DOMAINS.
REFERENCE  5 (residues 1 to 1706)
AUTHORS   Glaser,P., Elmaoglou-Lazaridou,A., Krin,E., Ladtant,D., Barzu,O. and
            Danchin,A.
TITLE
            Identification of residues essential for catalysis and binding of
            calmodulin in Bordetella pertussis adenylyl cyclase by
            site-directed mutagenesis
JOURNAL   EMBO J. 8 (3), 967-972 (1989)
MEDLINE   89251630
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REFERENCE  6 (residues 1 to 1706)
AUTHORS   Glaser,P., Munier,H., Gilles,A.M., Krin,E., Porcumb,T., Barzu,O.,
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TITLE     Functional consequences of single amino acid substitutions in
            calmodulin-activated adenylyl cyclase of Bordetella pertussis
JOURNAL   EMBO J. 10 (7), 1683-1688 (1991)
MEDLINE   91266896
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REFERENCE  7 (residues 1 to 1706)
AUTHORS   Danchin,A.
TITLE     Phylogeny of adenylyl cyclases
JOURNAL   Adv. Second Messenger Phosphoprotein Res. 27, 109-162 (1993)
MEDLINE   93119764
REMARK
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REFERENCE  8 (residues 1 to 1706)
AUTHORS   Hackett,M., Guo,L., Shabanowitz,J., Hunt,D.F. and Hewlett,E.L.
TITLE     Internal lysine palmitoylation in adenylyl cyclase toxin from
            Bordetella pertussis
JOURNAL   Science 266 (5184), 433-435 (1994)
MEDLINE   95025937
REMARK
PALMITOYLATION OF LYS-983.
REFERENCE  9 (residues 1 to 1706)
AUTHORS   Basar,T., Havlicek,V., Bezouskova,S., Halada,P., Hackett,M. and
            Sedo,P.
TITLE     The conserved lysine 860 in the additional fatty-acylation site of
            Bordetella pertussis adenylyl cyclase is crucial for toxin
            function independently of its acylation status
JOURNAL   J. Biol. Chem. 274 (16), 10777-10783 (1999)
MEDLINE   99214144
REMARK
PALMITOYLATION OF LYS-860.
COMMENT
On Sep 22, 2003 this sequence version replaced gi:117789.
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This SWISS-PROT entry is copyright. It is produced through a
collaboration between the Swiss Institute of Bioinformatics and
the EMBL outstation - the European Bioinformatics Institute.
The original entry is available from http://www.ebi.ac.uk/seqret
and http://www.ebi.ac.uk/sprot
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[FUNCTION] This adenylyl cyclase belongs to a special class of
bacterial toxin. It causes whooping cough by acting on mammalian
cells by elevating cAMP-concentration and thus disrupts normal cell
function.
[CATALYTIC ACTIVITY] ATP = 3',5'-cyclic AMP + diphosphate.
[ENZYMIC REGULATION] Activated by host calmodulin.
[SUBCELLULAR LOCATION] Secreted.
[DOMAIN] The Gly-rich region is probably involved in binding
calcium, which is required for target cell-binding or cyclolytic
activity (By similarity).
[PM] Released in a processed form.
[PM] Palmitoylated by CYAC. The toxin only becomes active when
modified in position Lys-983.
[SIMILARITY] In the N-terminal section, belongs to the adenylyl
cyclase class-2 family.
[SIMILARITY] IN THE C-TERMINAL SECTION, BELONGS TO THE RTX
PROKARYOTIC TOXIN FAMILY.
FEATURES
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precursor"
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TOIG of: q57506 check: 4927 from: 1 to: 1706
LOCUS       Q57506                1706 aa linear BCT 15-MAR-2004
DEFINITION  Bifunctional hemolysin-adenylate cyclase precursor (CycloLysin)
            (ACT) (AC-HLY) [Contains: Calmodulin-sensitive adenylate cyclase
            (ATP pyrophosphate-lyase) (Adenylate cyclase); Hemolysin].
ACCESSION   Q57506
VERSION     057506 GI:34978374
SOURCE      SwissProt: locus CYAA_BORBR, accession Q57506;
            extra accessions: Q05179, created: Nov 1, 1997.
            sequence updated: Oct 10, 2003.
            annotation updated: Mar 15, 2004.
            xrefs: gi: 11602642, gi: 11602643, gi: 33575039, gi: 33575359
            xrefs (non-sequence databases): HSP040136, InterPro:IPR005165,
            InterPro:IPR001343, InterPro:IPR003995, Pfam:PF03497, Pfam:PF00353,
            Pfam:PF02382, PRINTS:PR00313, PRINTS:PR0148, PROSITE:PS00330
KEYWORDS     Hemolysin; Virulence; CAMP biosynthesis; Lyase; Toxin; ATP-binding;
            Calcium-binding; Calmodulin-binding; Repeat; Lipoprotein;
            Palmitate; Whooping cough; Complete proteome.
SOURCE      Bordetella bronchiseptica
ORGANISM    Bordetella bronchiseptica
            Bacteria; Proteobacteria; Betaproteobacteria; Burkholderiales;
            Alcaligenaceae; Bordetella.
REFERENCE   1 (residues 1 to 1706)
AUTHORS     Betsou, F., Sismeiro, O., Danchin, A. and Guiso, N.
TITLE       Cloning and sequence of the Bordetella bronchiseptica adenylate
            cyclase-hemolysin-encoding gene: comparison with the Bordetella
            pertussis gene
JOURNAL     Gene 162 (1), 165-166 (1995)
MEDLINE     96009899
REMARK      SEQUENCE FROM N. A.
            STRAIN=CIP 9.73
REFERENCE   2 (residues 1 to 1706)
AUTHORS     Danchin, A. and Boursaux-Eude, C.
TITLE       Direct Submission
JOURNAL     Submitted (-DEC-2000)
REMARK      REVISIONS TO 1556-1559.
            3 (residues 1 to 1706)
            Parkhill, J., Sebatina, M., Preston, A., Murphy, L. D., Thomson, N.,
            Harris, D. E., Holden, M. T. G., Churcher, C. M., Bentley, S. D.,
            Mungall, K. L., Cerdano-Raraga, A.-M., Temple, L., James, K.,
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            Whitehead, S., Barrall, B. G. and Maskell, D. J.
            Comparative analysis of the genome sequences of Bordetella
            pertussis, Bordetella parapertussis and Bordetella bronchiseptica
            Nat. Genet. 35 (1), 32-40 (2003)
JOURNAL     22827954
REMARK      SEQUENCE FROM N. A.
            STRAIN=RB50 / ATCC BAA-588
            On Sep 23, 2003 this sequence version replaced gi:19864329.
COMMENT     This SWISS-PROT entry is copyright. It is produced through a
            collaboration between the Swiss Institute of Bioinformatics and
            the EMBL outstation - the European Bioinformatics Institute.
            The original entry is available from http://www.ebi.ac.uk/prot
            and http://www.ebi.ac.uk/prot
            [FUNCTION] This adenylate cyclase belongs to a special class of
            bacterial toxin. It causes whooping cough by acting on mammalian
            cells by elevating cAMP-concentration and thus disrupts normal cell
            function.
            [CATALYTIC ACTIVITY] ATP = 3',5'-cyclic AMP + diphosphate.
            [ENZYME REGULATION] Activated by host calmodulin.
            [SUBCELLULAR LOCATION] Secreted.
            [DOMAIN] The Gly-rich region is probably involved in binding
            calcium, which is required for target cell-binding or cytolytic
            activity (By similarity).
            [PTM] Released in a processed form.
            [SIMILARITY] In the N-terminal section, belongs to the adenylate
            cyclase class-2 family.
            [SIMILARITY] IN THE C-TERMINAL SECTION, BELONGS TO THE RTX
            PROKARYOTIC TOXIN FAMILY
FEATURES
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